INDIANA DEPARTMENT OF TRANSPORTATION

INTER-DEPARTMENT COMMUNICATION
Standards Section -- Room N642

June 15, 1998

DESIGN MEMORANDUM No. 98-01
POLICY CHANGE

TO: **All Design, Operations, and District Personnel, and Consultants**

FROM: ***/s/ Richard VanCleave***
Richard VanCleave
Design Policy Engineer, Technical Services Division

SUBJECT: **New Pipe Specifications, Standard Drawings, and Procedures**

EFFECTIVE: **All Projects with a Design Notice-to-Proceed or Start Development Date of June 1, 1997 or Later**

SUPERSEDES: **Design Memorandum No. 42 and All Addenda**

The following design policies apply to drainage structures:

I. Design Storm Requirements.

A. Culvert Structures.

	DESIGN CRITERIA		
FUNCTIONAL CLASSIFICATION	**ALLOWABLE HEADWATER**	**ROADWAY SERVICEABILITY**	**MAXIMUM VELOCITY**
INTERSTATE	Q_{100}	Q_{100}	Q_{50}
OTHER MULTI-LANE	Q_{100}	Q_{100}	Q_{50}
TWO-LANE			
ADT≥3000	Q_{100}	Q_{100}	Q_{50}
3000>ADT≥1000	Q_{100}	Q_{25}	Q_{25}
ADT<1000	Q_{100}	Q_{10}	Q_{10}
DRIVEWAYS	Q_{100}	Q_{10}	Q_{10}

B. Storm Drain Structures.

1. Design Storm Frequency—Q_{10}.

2. Check Storm Frequency—Q_{50}.

II. Structure Sizing Requirements.

A. New Culvert Structures.

1. Six Trial Priority System.
   a. Single Circular Pipe Installation.
   b. Single Deformed Pipe Installation.
   c. Single Specialty Structure Installation.
   d. Multiple Circular Pipe Installation.
   e. Multiple Deformed Pipe Installation.
   f. Multiple Specialty Structure Installation.

2. Pipe Installations Require Dual Hydraulic Designs.
   a. Smooth Interior Pipe Materials.
   b. Corrugated Interior Pipe Materials.

B. New Storm Drain Structures.

1. Inlet Spacing Based on Allowable Encroachment Width.

Roadway Type/No. of Travel Lanes	**Allowable Encroachment**	**Storm Frequency**
Interstate	Edge of Travel Lane	Q_{50}
More than Two Travel Lanes	Across One Half of a Travel Lane	Q_{10}
Two Travel Lanes	1.2 m onto Travel Lane	Q_{10}
Ramps	2.4 m of Ramp Must Remain Clear	Q_{10}
The Number of Travel Lanes Denotes the Number of Lanes used by Through Traffic		

2. System Modeling Must Include All Mains and Laterals.

3. Since All Acceptable Materials Have Smooth Interior Designation, Only One Hydraulic Design Required.

C. Specialty Structure Sizing Based on Single Hydraulic Design Appropriate for Specific Structure Type.

D. Pipe Extension Structures.

1. Extension Requires Selection of Specific Material.

2. Only One Hydraulic Design Required—Appropriate for Extension Material.

E. Extension of Reinforced Concrete Box, Slab-top, or Arch Culvert Structures.

1. Acceptable Extension Methods.
   a. Cast-in-place Reinforced Concrete Extension.
   b. Precast Reinforced Concrete Box Sections.

2. Only One Hydraulic Design Required—Appropriate for Proposed Extension Method.

III. Pipe Material Selection Process.

A. Pipe Structures (Except Type 4 Pipe Structures) Require Site Specific Analysis to Determine Acceptable Material(s).

1. Cover Height.

2. Service Life Parameters.
   a. Required Service Life Duration.
   b. Site Abrasive/Non-abrasive Designation.
   c. Structure pH.

B. If Multiple Pipe Materials Are Acceptable, Structure Designates Appropriate Pipe Type.

C. If Only One Pipe Material is Acceptable, Structure Specifies Required Material.

IV. Miscellaneous Pipe Related Design Issues.

A. Backfill.

1. B Borrow for Structure Backfill is Standard Backfill Material for All Drainage Structures.

2. If a Culvert Structure Requires Different Smooth Interior and Corrugated Interior Pipe Sizes, Backfill Quantities Must be Calculated for Both Alternates. However, the Quantity Required to Backfill the Smooth Alternate is Used to Calculate the Schedule of Pay Items Quantity.

B. Pipe End Treatments.

1. Outside Clear Zone.
   a. Pipe End Section Required for Structures up to 900 mm Diameter or Equivalent Deformed Pipe Size.
   b. Concrete Anchor Required for Larger Pipe Sizes.

2. Inside Clear Zone, Use Grated Box End Section or Safety Metal End Section in Accordance with Chapter 49 of Design Manual.

3. If Structure Requires Different Smooth Interior and Corrugated Interior Pipe Sizes, the Objects Required for Both Alternates Must Be Included in Pay Item.

This memorandum was prepared by Jeffrey G. James, Standards Staff Engineer, Technical Services Division.

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